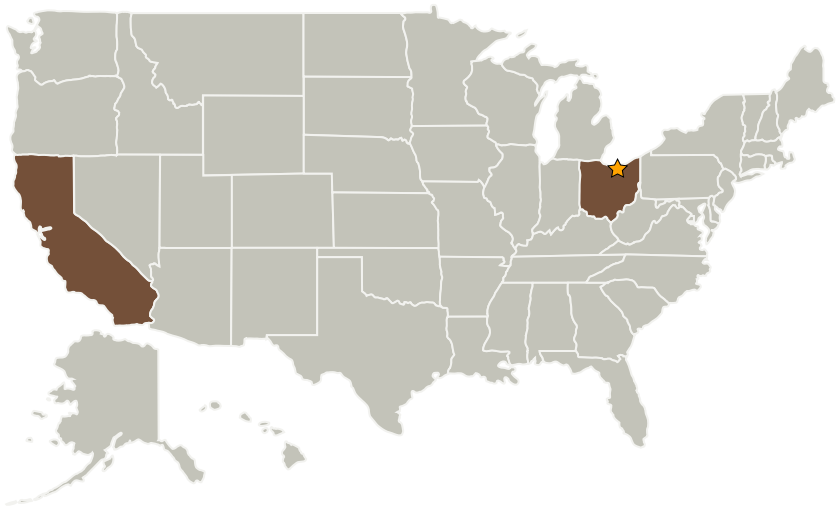
Radiation Hard High Performance Optoelectronic Devices, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

High-performance, radiation-hard, widely-tunable integrated laser/modulator chip and large-area avalanche photodetectors (APDs) are key components of optical transmitters and receivers that can dramatically lower the barriers to deployment and operation of high capacity in-space optical communication links. Agility Communications develops and manufactures widely-tunable CW sources and transmitters based on chip-scale integration of a Sampled-Grating Distributed Bragg Reflector (SG-DBR) laser with an Electroabsorption or Mach-Zehnder modulator. The performance characteristics of these devices include 40 nm wavelength coverage, multi- Gigabit/sec data rates, low drive voltage, and compatibility with high spectral efficiency and high-sensitivity modulation formats. Agility has licensed low-noise APD structures patented at the University of Texas at Austin. These devices have achieved record-setting noise and gain-bandwidth performance and are ideally suited for space-based, high-bandwidth optical links. During Phase I of this project we will study the effects of proton irradiation for SG-DBR lasers, InGaAsP bulk electroabsorption and electro-optic modulators, and APDs with InAlAs multiplication structure. Based on the results of Phase I, optimum chip design and process technology will be selected for development of small, efficient, radiation-hard integrated optical components in Phase II of the project.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Agility Communications, Inc.	Supporting Organization	Industry	Goleta, California

Primary U.S. Work Locations	
California	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Yuliya Akulova

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.3 Lasers